The Thought Uniqueness Hypothesis

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We propose a ban of equivalent, but more compex LF representations constructed from the same lexical concepts as a simpler one. The ban can be seen largely as an extralinguistic condition, but subsumes two lines of work previously seen as conditions applying within the language system, namely interpretive economy of Fox (2000) and restrictions on semantic type-flexibility by Heim (2017) and Hirsch (2016, 2017). Our unification also makes better empirical predictions and allows a link to recent work on scalar alternatives.

Proposal We formulate the Thought Uniqueness Hypothesis (TUH) in (1) as a ban on LF representations that are unnecessarily complex, whereby specifically we refer to the lenght of variable binding dependencies (Fox 2000).

(1) **TUH** An interpretable LF representation B is banned if an LF representation A exists with:

a. A consists only of lexical terminals of B and any λ-operators and variables
b. ⟦A⟧=⟦B⟧
c. A has *lower dependency complexity (DC)* than B (i.e. DC(A) < DC(B)).

For concreteness, we assume that dependency complexity grows exponentially by doubling for each branching node on the path between an occurrence of a variable and its binder:

(2) **Dependency Complexity (DC)** Let var(A) be the set of occurrences of bound variables in A and len(x) be the number of branching nodes between a single occurrence $x \in$ var(A) and its binder λ_x. Then we define the dependency complexity of A as:

$$\mathrm{DC(A)} = \sum_{x \in \mathrm{var(A)}} 2^{\mathrm{len}(x)}$$

Binding Economy Dahl (1974) observes that the sentence in (3a) followed by ellipsis *Bill does too* lacks an interpretation where the first pronoun receives a sloppy interpretation and the second a strict interpretation. Fox (2000) accounts for Dahl's observation by means of ruling out long binding as in (3b) when local binding as in (3a) is possible. In (3), we indicate the relevant dependencies and, for some, their length to demonstrate that Fox's account can be subsumed under the TUH.

(3) a. John λ_1 1 said that he$_1$ λ_2 2 likes his$_2$ mother (len 4, len 4) DC = 2^4+2+2*4+2 = 36
b. *John λ_1 1 said that he$_1$ likes his$_1$ mother (len 6) DC = 2^6+2^4+2 = 82

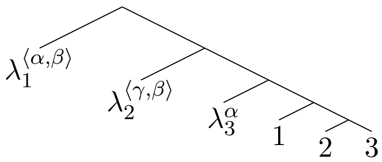
Reconfigurations of (3b) (regardless of syntactic plausibility) cannot reduce DC below that of (3a), e.g.:

(3) c. *John λ_1 1 said that he$_1$ his$_1$ λ_2 likes 2's mother (len 5, len 2) DC = 2^5+2^4+2+2^2 = 54

Blocking Geach: Raising verbs The Geach rule (Geach 1972, Jacobson 2014) applies to a function of type $\langle \alpha, \beta \rangle$ to derive one of type $\langle \gamma\alpha, \gamma\beta \rangle$. But Heim (2017, building on Dowty 1985, Jacobson 1990) argues though that raising verbs like *seem* (type $\langle st, st \rangle$) cannot be Geach-lifted to the type of a control verb $\langle est, est \rangle$. One argument of Heim's rests on the contrast between control verbs in (4a) and *seem* in (4b) with null-complement anaphora.

(4) a. Mary tried/wanted to float. Bill tried/wanted too.
b. Mary seemed/appeared to float. *Bill seemed/appeared too.

The general Geach rule corresponds to the λ-term in (5) (specifically $\mathbf{G}^{e}_{st,st}$ is relevant here). Any Geach rule has a fixed DC of 20. Therefore the raising representation (5a) with DC 4 blocks the control representation (5b).

(5) $\mathbf{G}^{\gamma}_{\alpha,\beta}$ =  DC = 2*2^3 + 2^2 = 20

(6) a. Mary λ_1 seemed/appeared t_1 to float DC = 4
b. *Mary [$\mathbf{G}^{e}_{st,st}$(seemed/appeared) to float] DC = 20

Allowing Lexicalized Geach: 'little' Heim (2017) argues that predicate negation (type $\langle et, et\rangle$) is also not available. To explain this her type economy principle blocks any lexical entry that is definable from boolean negation (type $\langle t, t\rangle$) and a Geach rule. However, Heim herself (2006, 2008) and Büring (2007) argue that *little* should be analyzed as a negation of type $\langle dt, dt\rangle$. Heim's (2006) analysis is inconsistent with Heim's (2017) proposal, but consistent with the TUH since *little* is a different lexical concept from *not*.

Scope Economy The scope restriction in (7) from Fox (2000) and many similar cases can also be subsumed under the TUH:

(7) Some boy admires every teacher. Every girl does too. (some $\gg$ every, *every $\gg$ some)

We propose that transitive verbs are of type $\langle e, est\rangle$. The world argument being outer-most requires a Geach rule application for 'in situ' interpretation of both subject (once) and object quantifiers (twice) (see (8c) and (8d)). Furthermore two shorter dependencies as in (8a) are preferred over on longer one as in (8b). (8b) is available for inverse scope of non-commutative quantifiers.

(8) a. every girl λ_1 every teacher λ_2 w [1 admires 2] DC = 2^3 + 2^2 = 12
b. *every teacher λ_2 every girl λ_1 w [1 admires 2] DC = 2^1 + 2^4 = 18
c. *every girl λ_1 w [1 admires $\mathbf{G}^{e}_{est,st}$[$\mathbf{G}^{s}_{et,t}$[every teacher]]] DC = 2*20 + 2 = 22
d. $^*w$ $\mathbf{G}^{s}_{et,t}$[every girl] admires $\mathbf{G}^{e}_{est,st}$[$\mathbf{G}^{s}_{et,t}$[every teacher]]] DC = 3*20 = 60

Conjunction Reduction Hirsch (2017) derives that both (9a) and (9b) lack a wide scope interpretation of *and* from the assumption that *and* must receive a type $\langle t, tt\rangle$ interpretation (in addition to scope economy applying in each conjunct).

(9) a. Some company hired a maid and fired a cook. (some $\gg$ and, *and $\gg$ some)
b. Some company hired a maid and a cook. (some $\gg$ and, *and $\gg$ some)

Hirsch's LF-representations for (9b) is shown in (10a) and the Geach alternative in (10b). Hirsch's data can be subsumed under the TUH if we assume that the two occurrences of t_1 in (10a) that are bound ATB in parallel only contribute once to dependency complexity.

(10) a. Sm co. λ_1 [a maid λ_2 w t_1 hired t_2] and [a cook λ_2 w t_1 ~~hired~~ t_2] DC = 2*2^3 + 2^5 = 48
b. *Sm co. λ_1 [a maid $\mathbf{G}^{et}_{t,t}$(and) a cook] λ_2 w t_1 hired t_2] DC = 20 + 2^3 + 2^5 = 60

[Not shown in detail: Like Hirsch we need to limit the domain of TUH to individual conjuncts.]

Further Support The TUH replaces two previously established linguistic assumptions with a novel perspective. If we identify LF representations with language-independent thought, the TUH argues that thought representations are built for efficiency independent of communication (Berwick & Chomsky 2015). Furthermore, the TUH might be derived from application of exhaustification of a B where even an equivalent alternatives A with lower DC must be excluded (cf. Fox and Katzir 2011). Any representation B banned by TUH would then trigger an obligatory contradiction: B $\wedge \neg$ A, while $[\![A]\!] = [\![B]\!]$.

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